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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/538,380

06/13/2005

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81844.0037

5063

26021 7590 05/14/2008

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EXAMINER

MOWLA, GOLAM

ART UNIT

PAPER NUMBER

4132

MAIL DATE

DELIVERY MODE

05/14/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/538,380	Applicant(s) NAKATA ET AL.	
	Examiner Golam Mowla	Art Unit 4132	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06/13/2005, Preliminary Amendment.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>01/15/2008 and 06/13/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 recites the limitation "back sealer" in line 2. There is insufficient antecedent basis for this limitation in the claim. It is suggested said claim be changed to "The transparent thin-film solar-cell module according to claim 1 further comprising a back sealer, wherein the back sealer is composed of a fluorocarbon resin or glass."

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claim 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kishi et al. (US 4795500, listed in IDS).

As to claims 1 and 3, Kishi discloses a transparent thin-film solar-cell module (transparent photovoltaic device, see abstract) comprising a multilayer film comprising a first electrode layer (front electrode 3, figs. 1-6; Col. 2, line 40 - Col. 3, line 9), a semiconductor layer (photoactive semiconductor layer 4, figs. 1-6; Col. 2, line 40 - Col. 3, line 9), and a second electrode layer (back electrode 5, figs. 1-6; Col. 2, line 40 - Col. 3, line 9) stacked in that order on a main surface of a transparent insulating substrate (transparent insulating substrate 1, figs. 1-6; Col. 2, line 40 - Col. 3, line 9); a cell region comprising a plurality of photoelectric conversion cells connected in series (photoelectric conversion elements 2 shown in the drawing as a congregation of a plurality of elements by means of being connected in series, see figs. 1-6); and a plurality of light-transmissive aperture holes (hole 6, see figs. 1-6) in the cell region, the light-transmissive aperture holes (6) each having a diameter of 100 μm (0.1 mm; Col. 2, lines 67-68), the plurality of light-transmissive aperture holes being disposed in a line (see fig. 6 in

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which the holes 6 are disposed in a line) at a distance D (distance D, fig 9) between the centers of the light-transmissive aperture holes.

Claim 1 recites the limitation “the plurality of light-transmissive aperture holes being formed by removing at least the second electrode layer.” However, this limitation has not been given any patentable weight, because this is a product-by-process limitation. Therefore, the determination of patentability is based on the product, and not on the method (such as removing the second electrode layer to form aperture) of making the product. See MPEP 2113 [R-1] Product-by-Process Claims. See also *In re Thorpe*, 777F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Kishi is silent as to whether the distance D, as shown in figure 9, between the centers of the light-transmissive aperture holes of 1.01 to 2 times the diameter of each light-transmissive aperture hole.

However, it is well known in the solar-cell art to utilize a large number of aperture holes in order to increase the transmission of light as shown by Kishi (Col. 3, lines 10-14).

In addition, one of ordinary skill in the art realizes that such a ranged distance to dispose the aperture holes can be obtained by routine experimentation. “Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation” - MPEP § 2144.05.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to determine the optimum distance by routine

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experimentation for disposing the aperture holes, because it allows for a large number of aperture holes, and thus increases the transmission of light, as desired by Kishi.

As to claim 2, Kishi further discloses that the light-transmissive aperture holes are disposed in a straight line (see fig. 5).

Kishi is silent as to whether the holes are disposed at intervals of 1.01 to 1.5 times the diameter of the hole.

However, it is well known in the solar-cell art to dispose the holes as closely as possible to provide a large number of aperture holes to increase the transmission of light as shown by Kishi (Col. 3, lines 10-14).

In addition, one of ordinary skill in the art realizes that such an interval range to dispose the aperture holes can be obtained by routine experimentation. "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation" - MPEP § 2144.05.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to determine the optimum interval distance by routine experimentation for disposing the aperture holes, because it allows for an increased transmission of light by disposing the holes as close as possible to provide for a large number of aperture holes, as desired by Kishi.

As to claim 4, Kishi further discloses that the area ratio of the total area of the light-transmissive aperture holes to the area of the cell region is 5% to 30% (Col. 3, lines 5-9).

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As to claims 5 and 6, Kishi further discloses that the light-transmissive aperture holes are disposed in a line parallel to the series-connection direction of the photoelectric conversion cells, and to each other at regular intervals (as shown in fig. 5, the holes 6 are disposed in line parallel to the connection direction of the cells, and the lines are parallel to each other at regular intervals).

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kishi as applied to claim 1, and further in view of Psyk et al. (US 6274804).

Kishi discloses a transparent thin-film solar-cell module as discussed above for claim 1. Kishi further discloses that the module comprises a back sealer back sealer (back surface 7, fig. 1, Col. 3, lines 14-18). Kishi also discloses that the back sealer is composed of EVA or epoxy or acrylic resin.

Kishi is silent as to whether the back sealer comprises glass or fluorocarbon resin.

However, it is well known in the solar-cell art to utilize fluorocarbon or glass as the back sealer. Psyk discloses a solar cell module (see title, abstract, and fig. 11) wherein back sealer is composed of glass (Col. 3, lines 28-36). Psyk uses glass wafer as the back sealer because such is conventional in the art as it allows for transmission of light from the back surface as well (besides front surface).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to utilize the glass wafer of Psyk in the solar-cell module of Kishi, because such is conventional in the art as it allows for transmission of light from the back surface as well (besides front surface).

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8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kishi as applied to claim 1, and further in view of Yamaguchi et al. (US 4773943).

Kishi discloses a method of making a transparent thin-film solar-cell module as discussed above for claim 1.

Kishi is silent as to whether the light-transmissive aperture holes are formed by irradiating the multilayer film with laser light, wherein the distance between the centers of adjacent light-transmissive aperture holes disposed in a straight line is determined by the frequency of Q-switching of the laser light and a relative scanning velocity between the transparent insulating substrate and the laser light.

Yamaguchi discloses a method for producing a solar cell module (photovoltaic device, see title and abstract) wherein the light-transmissive aperture holes (51, fig. 10) are formed by irradiating the multilayer film with laser light (Col. 11, lines 13-20), wherein the distance between the centers of adjacent light-transmissive aperture holes disposed in a straight line (see fig. 10 for disposing of holes 51 in a horizontal straight line) is determined by the frequency of Q-switching of the laser light and a relative scanning velocity between the transparent insulating substrate and the laser light (Col. 11, lines 13-20).

Yamaguchi uses laser light irradiation to form light-transmissive aperture holes because it allows for a solar cell module with a larger light-receiving area on the insulative substrate having predetermined size and higher output. Yamaguchi further uses Q-switching frequency and relative scanning velocity to dispose the aperture holes in a straight line because it allows for a solar cell module with a

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larger light-receiving area on the insulative substrate having predetermined size and higher output (Col 4, line 66 – Col. 5, line 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to utilize the laser irradiation and Q-switching frequency and relative scanning velocity methods of Yamaguchi in the solar cell module of Kishi to form aperture holes and to dispose the aperture holes in a straight line, respectively, because such methods are conventional in art as it allows for forming a solar cell module with a larger light-receiving area on the insulative substrate having predetermined size and higher output, as taught by Yamaguchi.

9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kishi in view of Yamaguchi as applied to claim 8, and further in view of Nostrand et al. (US 4166918).

Kishi in view of Yamaguchi discloses a method for making a transparent thin-film solar-cell module as discussed above for claim 8.

Neither Kishi nor Yamaguchi explicitly disclose whether the method comprises performing reverse-bias treatment after forming the light-transmissive aperture holes.

However, it is well known in the solar-cell art to apply reverse-bias to burn out electrical shorts and shunts during the fabrication of the solar cell as taught by Nostrand (see abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to perform the reverse-bias technique of

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Nostrand in the method of Kishi, because such technique is conventional in the solar-cell art to burn out electrical shorts and shunts, as taught by Nostrand.

Correspondence/Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Golam Mowla whose telephone number is (571)270-5268. The examiner can normally be reached on Monday to Friday, 8 AM to 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on (571)272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/G. M./

Examiner, Art Unit 4132

/Jessica L. Ward/

Supervisory Patent Examiner, Art Unit 4132